COMPETITION ECONOMISTS GROUP

WACC, Inflation compensation and financeability for WaterNSW

Dr. Tom Hird

April 2020

CEG Asia Pacific
234 George Street
Sydney NSW 2000
Australia
T: +61 2 9881 5754
www.ceg-ap.com

COMPETITION ECONOMISTS GROUP

Table of Contents

COMPETITION ECONOMISTS GROUP

List of Figures

List of Tables

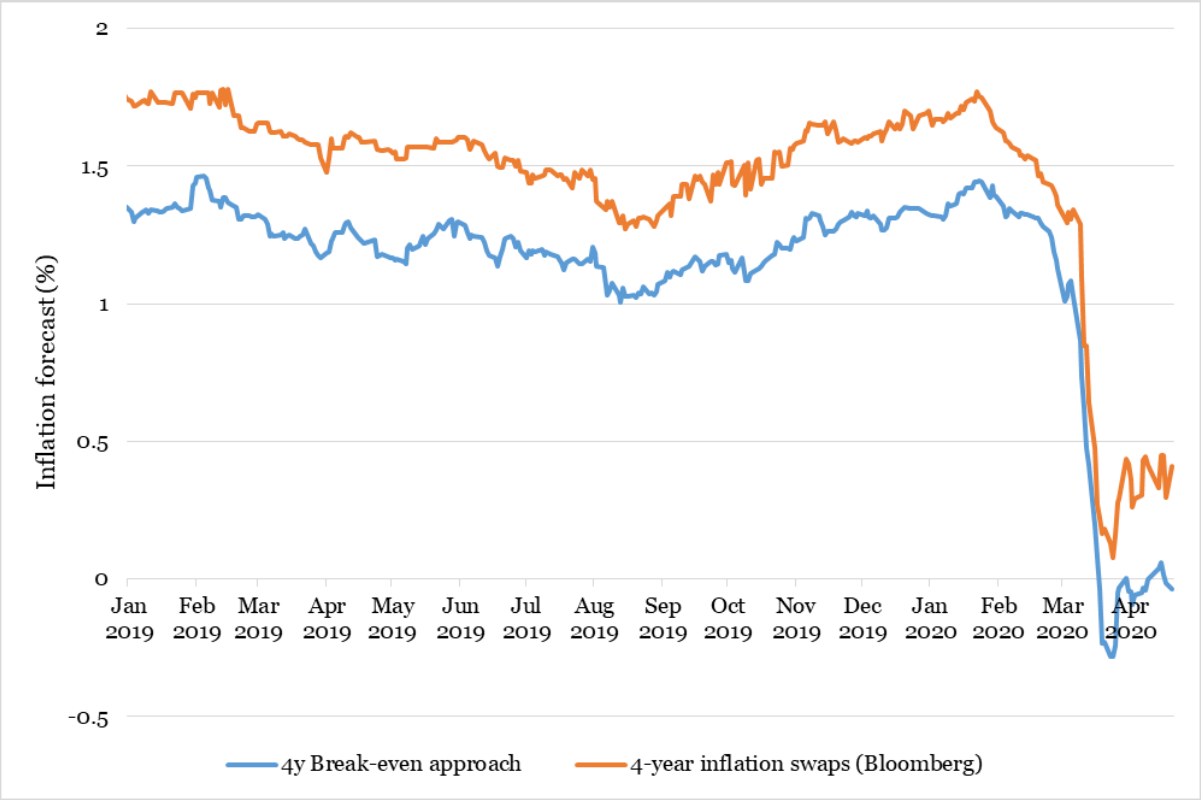
1 Executive summary

1. The report addresses issues arising from the COVID-19 epidemic for WaterNSW's cost of capital, inflation compensation and financeability over the 2020-24 regulatory period.

1.1 Heightened uncertainty

2. Market based measures of expected inflation have fallen dramatically over the last month. They are now a full 2.0% below the current IPART method estimate of 2.3%, as seen in Figure 1-1 below. In addition, the breakeven inflation series suggests that bond market participants are pricing in close to zero inflation on average over the next four years. Whether one considers these market estimates of inflation will be borne out in reality, they are, at a minimum, indicative of extremely high levels of uncertainty about the future path of inflation.

Figure 1-1: 4 year breakeven inflation and inflation swaps



Source: Bloomberg, RBA, CEG analysis

3. Uncertainty can also be observed from other market data, such as the Bloomberg BVAL AUD 10-year BBB debt premium increasing by approximately 0.9% since the

beginning of March 2020, as well as IPART's uncertainty index triggering the 'one standard deviation' threshold, above which IPART will review its benchmark WACC estimates.

4. Furthermore, various Australian and international institutions have recently published statements referring to uncertainty in economic conditions as pertains to growth, inflation, and unemployment. These institutions include: the Commonwealth Treasury; the RBA; the US Federal Reserve; and the IMF.

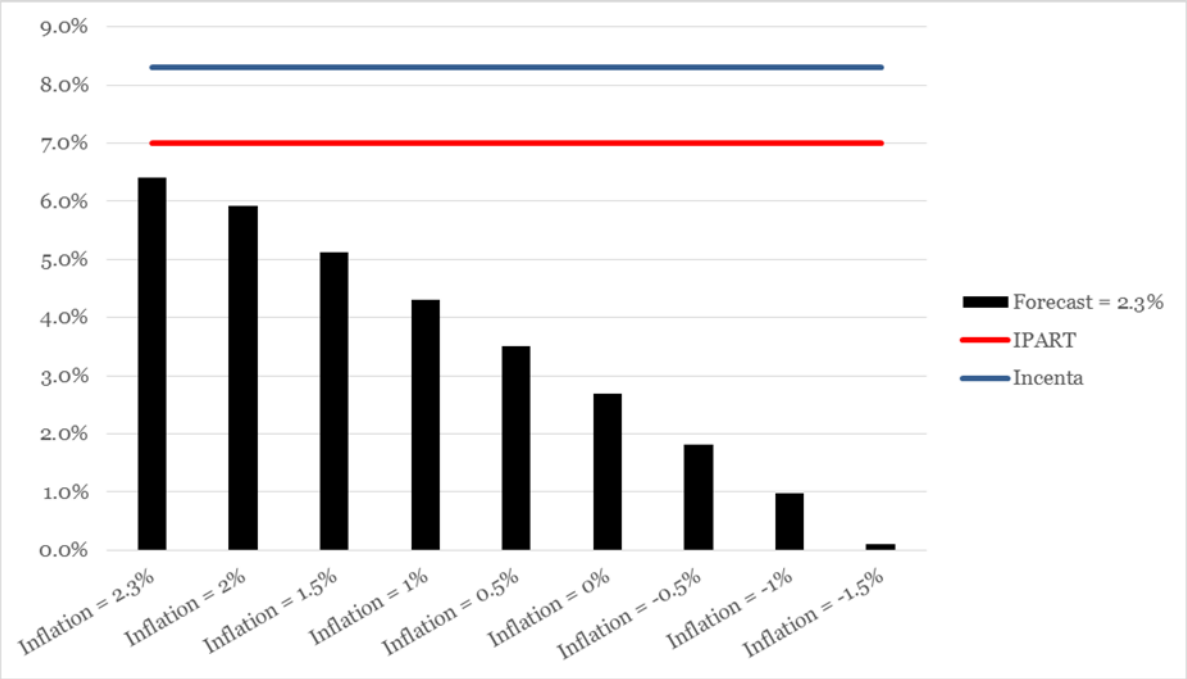
1.2 Impact on financeabiltiy

5. The heightened uncertainty about inflation outcomes has important implications for the financeability of WaterNSW. In IPART's draft report, WaterNSW was projected to achieve lower than the IPART BBB threshold for real free funds from operations (FFO) over debt (albeit with above threshold real interest coverage ratio (ICR)).

6. However, these forecasts of financeability metrics are predicated on IPART's inflation forecast of 2.3% actually occurring. Specifically, the metrics forecast by IPART are real (inflation adjusted) metrics that explicitly rely on WaterNSW being able to raise new debt each year (a source of funds) backed by a RAB that is assumed to be rising at 2.3% pa.

7. Given the evidence surveyed above, it must be acknowledged that there is a material probability that actual inflation will be lower than this. Figure 1-2 below shows the average FFO to debt over the four-year regulatory period under different assumptions about what actual inflation turns out to be. In each case it is assumed that IPART's forecast of inflation is 2.3%. The lower actual inflation is, the lower the outturn real FFO to RAB will be – this is because growth in the RAB is lower and, therefore, there is less funding available from new debt backed by the growing RAB.

Figure 1-2: Real FFO to Debt for different actual inflation outcomes



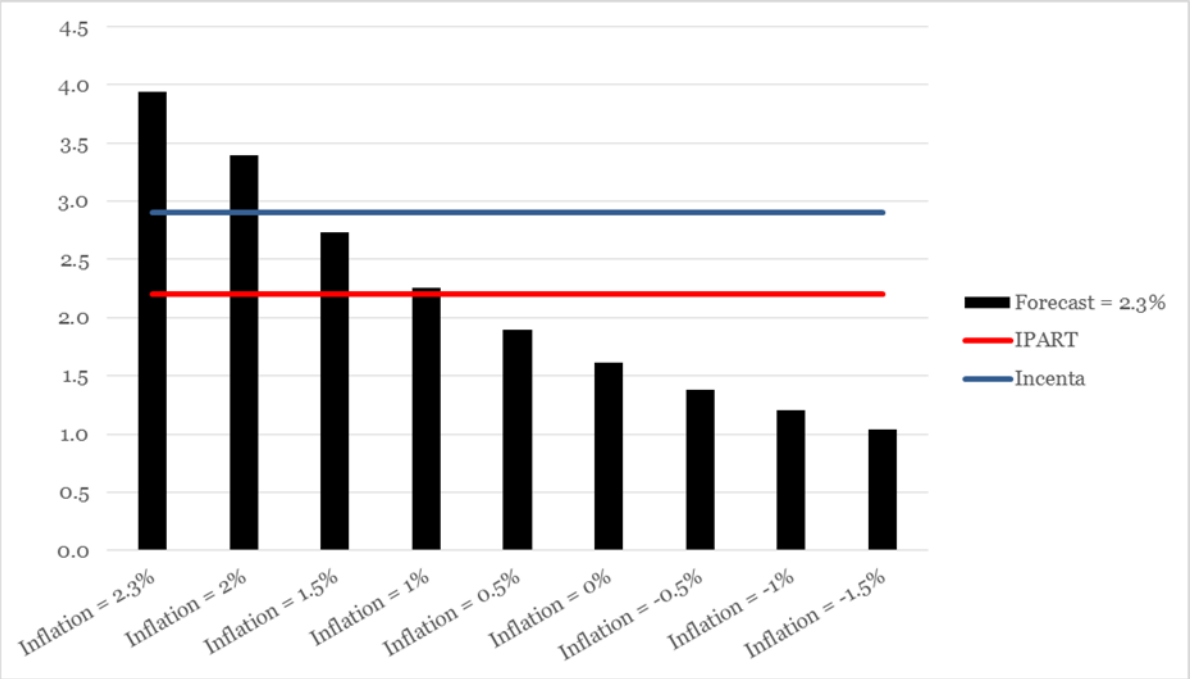
*Source: CEG analysis, IPART draft report financial model for WaterNSW; *These scenarios assume a current debt margin of 2.55% (including 16 bp for debt raising costs and annualisation factor adjustment) as estimated in an accompanying CEG report for March 2020.*

8. It can be seen that if actual inflation is in line with market-based forecasts (between 0.0% and 0.5%) then real FFO to debt would be less than half of the IPART BBB threshold of 7.0%. We also include the threshold that results from applying Incenta's advice to IPART regarding the appropriate adjustment between from nominal to real thresholds. It can be seen that, even if actual inflation was 2.3% the real FFO to debt metric would be much lower than the Incenta version of the threshold.

9. Similarly, under the assumption that inflation will actually be 2.3% pa, WaterNSW will achieve a higher real ICR than both IPART and Incenta's BBB threshold of 2.2%. However, if inflation is in line with market estimates of 0.0% to 0.5% then real ICR will be below both thresholds, as shown in Figure 1-3.[1]

[1] The formula for real ICR is $Real\ ICR_t = \frac{Real\ FFO_t + r_t}{r_t}$. As shown in the figure, real ICR declines logarithmically as real interest rates rise.

Figure 1-3: Real ICR for different actual inflation outcomes



*Source: CEG analysis, IPART draft report financial model for WaterNSW. *These scenarios assume a current debt margin of 2.55% (including 16 bp for debt raising costs and annualisation factor adjustment) as estimated in an accompanying CEG report for March 2020.*

10. This extreme uncertainty implies a heightened probability of forecast error and, therefore, a heightened probability that WaterNSW finds itself is in the middle range of the depicted inflation outcomes where it:

    - Falls badly short of IPART's real FFO to debt BBB threshold; and
    - Falls short, or only just exceeds, IPART's real ICR BBB threshold.

11. It would therefore be prudent for IPART to pre-empt the problem by making changes to its approach towards inflation.

1.3 Solutions

12. At a high level, we propose solutions to these two (related but separate) problems:

    a. IPART should put in place a mechanism to eliminate the impact of inflation forecast error on the compensation provided for WaterNSW's services; and

    b. IPART should put in place a mechanism by which revenues in the upcoming regulatory period can be raised, in a present value neutral manner, to improve the financeability of WaterNSW's business.

13. There are a number of different ways for IPART to implement policies that give effect to these solutions. The specific implementations we examine in this report are:

    a. Eliminate windfall gains and/or losses from inflation forecast error by having a mechanism to "true up" any inflation forecast error. The mechanics for how this could be achieved include the following two options:

        i. Rolling forward the opening RAB in 2024 by using the same value for inflation as the forecast for inflation that is used in IPART's revenue model to derive a real WACC. That is, instead of using actual inflation in the RAB roll forward model, the forecast of inflation that was used in the revenue model could also be used in the RAB roll forward model;[2]

        ii. Creating a new asset value to be included in the RAB in 2024 that is calculated as the value of the inflation forecast error in the 2020-24 regulatory period. This can then be depreciated over a defined period (e.g., one or two regulatory periods). (This is mathematically identical to approach (i) if the period over which this asset is depreciated is the remaining average remaining life of the RAB).

    b. Address residual financeability concerns by one, or all, of the following measures:

        i. Adopt an effective inflation forecast that is lower than that derived from IPART's previously published method. A lower effective inflation forecast can be achieved by directly lowering the inflation forecast in IPART's revenue model (e.g., to 1.7%) or by including a new building block in the model that captures the cost difference between an inflation forecast of 2.3% and 1.7%.

            - Note that, because a lower effective inflation forecast is combined with approach (a)(i) or (a)(ii) above, there is no NPV impact of adopting a lower effective inflation forecast. The only impact is that more cost is recovered in 2020-24 and less in subsequent regulatory periods;

        ii. Accelerate depreciation over the 2020-24 period in order to bring forward compensation to the 2020-24 period in an NPV neutral manner.

14. An effective inflation forecast of 1.7% would represent a 2/3rd weight to 2.3% and a 1/3rd weight to the top of the range for market-based estimates of four year inflation (0.5%). It would also be consistent with the RBA's February Statement of Monetary Policy one year forecast for the year ended June 2021.

15. It is worth noting that an annual true up for inflation forecast error within 2024 is a single measure that combines both solutions (i.e., combines both: (a) an NPV neutral inflation true up; and (b) raising revenues in 2024 to account for the high risk of

[2] This will have the effect of 'adding back in' to the RAB the same value of inflation that was removed from revenues in the 2020-24 regulatory period.

below forecast inflation). Specifically, if there was a difference between actual and forecast inflation during a given year of the 2020-24 regulatory period prices in subsequent years of the 2020-24 regulatory period [3] would be adjusted upwards/downwards as appropriate to eliminate the NPV impact of the forecast error.[4]

16. An annual true up is, due to annual price adjustments, administratively more complex than simply using forecast inflation to roll forward the RAB. However, if IPART maintains an effective inflation forecast of 2.3%, our view is that the administrative complexity of an annual true up approach would be justified (given the high probability for exceptionally large forecast error using a 2.3% inflation forecast).

17. Should IPART fail to adapt its approach to the new economic circumstances then:

- It is highly likely that its forecast for inflation, based on its previously published method, will be materially different to actual inflation, thus creating very material windfall gains and losses for stakeholders (of around 2% of RAB per annum if market based estimates turn out to be correct); and
- Even if IPART's forecast for inflation is assumed to be an accurate *ex ante* forecast of actual inflation, there will still be a financeability problem for WaterNSW as identified by the real FFO to debt metric (a problem which will be extremely aggravated if, as is highly likely, IPART's inflation forecast does not accurately forecast actual inflation).

1.4 Adjusting the WACC absent adoption of solutions

18. The current levels of market wide uncertainty can be expected to raise the required return for equity investors across the economy, including for investors in WaterNSW. We consider that the most effective way that IPART can deal with this uncertainty is to implement the solutions set out above.

19. If these solutions are put into effect, it would be reasonable for IPART not to implement any, or at most a modest, increase in the WaterNSW's WACC. This conclusion is based on recognition that IPART's WACC regime already responds appropriately to heightened uncertainty by virtue of raising the current market risk premium estimate well above the long term estimate (9.7% vs 6.0%). When this is

[3] Forecasts errors in the final year of 2020-24 would need to be adjusted for in the 2024-28 regulatory period.

[4] Under this approach, even if a 2.3% inflation forecast was maintained, if inflation was 1.0% pa then the 'true up' would be applied to revenues within the regulatory period. This immediate increase in revenues would address the financeabilty problem directly and, consequently there would be no need to escalate the RAB to 2024 using forecast inflation (2.3%) instead of actual inflation (1.0%).

combined with our estimate of the elevated current debt risk premium (2.55%) and also the inflation true up the case for a further WACC uplift is to respond to the heightened uncertainty is reduced.

20. However, if IPART chooses not to implement an inflation "true up", then a material the uplift to the WACC for heightened uncertainty is required. Indeed, should IPART not commit to an inflation 'true up' then, arguably, equity in WaterNSW will be regarded as higher risk than the market as a whole over the next four years.

21. This is because the extreme uncertainty around inflation forecasts creates extremely elevated undiversifiable beta risk for WaterNSW over the 2020-24 regulatory period. To see why, consider the correlation of WaterNSW equity return with the market return under two scenarios:

    a. IPART forecasts 2.3% inflation and this turns out to be more or less accurate. This scenario is consistent with a positive outcome for the overall economy and WaterNSW equity investors receiving their target nominal rate of return (around 7.5%);

    b. IPART forecasts 2.3% inflation but actual inflation turns out to be 0.5% (in line with the top of the range for inflation swaps). This outcome is consistent with a negative outcome for the overall economy and WaterNSW equity investors receiving a nominal return that is less than half the target (3.0% instead of 7.5%). This 4.5% shortfall is comprised of:

        i. 1.8% lower direct compensation to equity investors (1.8% is the inflation forecast error); but also

        ii. 2.7% lower equity returns resulting from 1.8% under-compensation for the cost of debt. Equity investors bear the costs of under-compensation for the nominal cost of debt but, given that debt is 1.5 times equity the cost to equity holder is 1.5 times 1.8% (2.70%);

22. This simple example illustrates how, absent an inflation 'true up' mechanism, the prevailing extreme levels of inflation forecast risk materially increase beta risk for WaterNSW equity investors. Should IPART decide not to implement a 'true up' mechanism for inflation forecast error then we consider that an uplift to the equity beta of at least 0.2 should be applied.

23. A 0.2 uplift to the equity beta raises the post-tax WACC by around 0.6%. This same uplift can be achieved by giving zero weight to the current WACC estimates and 100% weight to the long-term WACC estimates.

2 Introduction

24. In this report we address the following issues and their resulting implications, as well as how IPART can take these into account in its final determination for WaterNSW:

    a. Section 3 surveys the exceptional impact of the COVID 19 pandemic on the economy as a whole on inflation forecasts more specifically;

    b. Section 4 examines the impact of uncertainty surrounding inflation outcomes on financeability of WaterNSW;

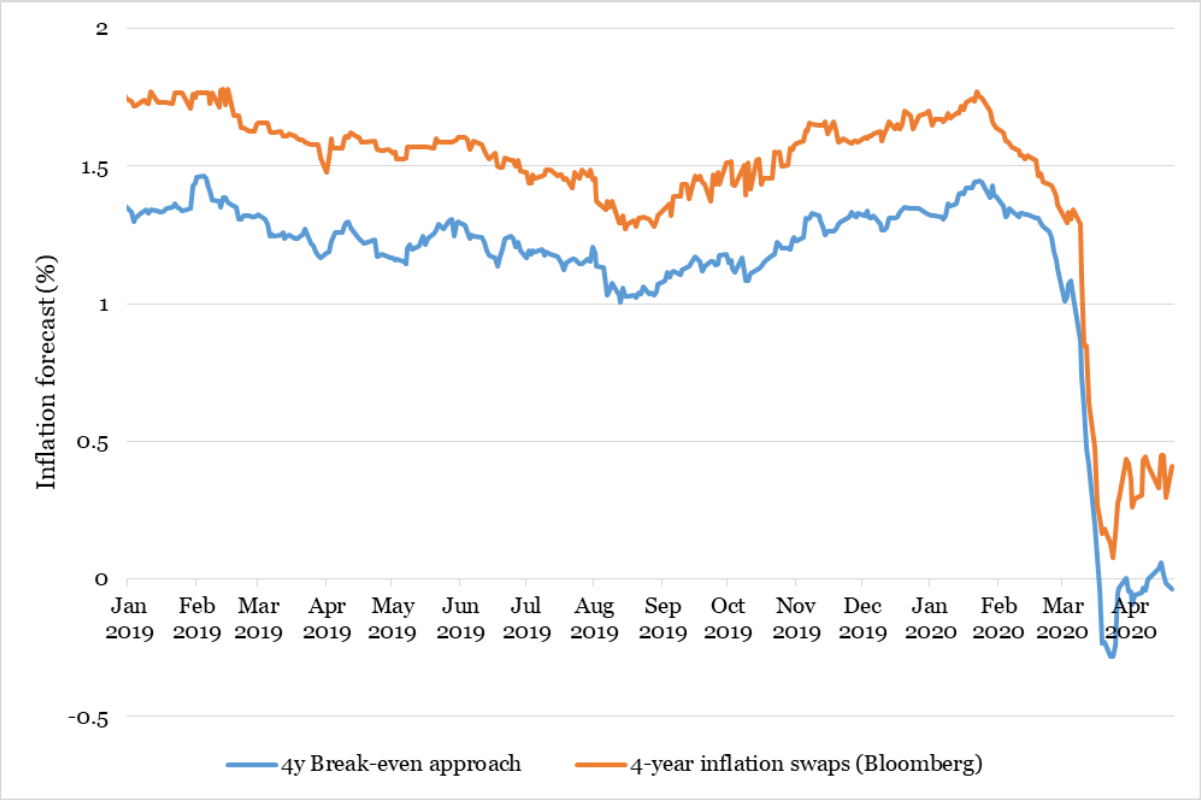
    c. Section 5 describes how the uncertainty around the inflation forecast can best be mitigated, and in so doing, reduce or eliminate financeability problems and the prospect of extreme windfall gains/losses accruing to stakeholders as a result of regulatory forecast error.

    d. Section 6 addresses how heightened uncertainty should be reflected in the WACC, particularly in terms of the risk adjusted cost of equity.

3 Unprecedented uncertainty about the path of economic activity

25. Market based measures of 4-year expected inflation have fallen dramatically over the last month. They are now a full 2.0% below the current IPART method estimate of 2.3%, as shown in Figure 3-1.

Figure 3-1: 4 year breakeven inflation and inflation swaps



Source: Bloomberg, RBA, CEG analysis

3.1 Overall levels of economic uncertainty

26. The Commonwealth Treasury is predicting that the unemployment rate for the June quarter 2020 will double to 10%.[5] The IMF has predicted that the global economy will shrink by 3%, with larger predicted contractions for developed countries –

[5] ABC News, Unemployment rate predicted to reach 10 per cent amid coronavirus pandemic, pushing Australia into recession, 13 April 2020. Available at: https://www.abc.net.au/news/2020-04-13/coronavirus-unemployment-covid-19-treasury-figures-jobless-rate/12145542 (accessed 20 April 2020).

including a 6.7% contraction for Australia (with similar or larger contractions in the US and Europe).[6] The IMF hypothesises a rebound in economic activity should the spread of SARS-CoV-2 can be contained.

> *A partial recovery is projected for 2021, with above trend growth rates, but the level of GDP will remain below the pre-virus trend, with* ***considerable uncertainty about the strength of the rebound.***
>
> ***Much worse growth outcomes are possible and maybe even likely****. This would follow if the pandemic and containment measures last longer, emerging and developing economies are even more severely hit, tight financial conditions persist, or if widespread scarring effects emerge due to firm closures and extended unemployment.*

27. However, the IMF, like all reputable economic forecasters in the current environment, emphasises the uncertainty that currently abounds [emphasis added].

> *This crisis is like no other. First, the shock is large. The output loss associated with this health emergency and related containment measures likely dwarfs the losses that triggered the global financial crisis. Second, like in a war or a political crisis,* ***there is continued severe uncertainty about the duration and intensity of the shock****.*[7]

28. The IMF repeatedly emphasises the extremely uncertainty around any forecasts and emphasises that the downside risks to forecasts are greater than the upside.

> ***There is extreme uncertainty around the global growth forecast****. The economic fallout depends on factors that interact in ways that are hard to predict, including the pathway of the pandemic, the intensity and efficacy of containment efforts, the extent of supply disruptions, the repercussions of the dramatic tightening in global financial market conditions, shifts in spending patterns, behavioral changes (such as people avoiding shopping malls and public transportation), confidence effects, and volatile commodity prices. Many countries face a multi-layered crisis comprising a health shock, domestic economic disruptions, plummeting external demand, capital flow reversals, and a collapse in commodity prices.* ***Risks of a worse outcome predominate.***

29. The IMF elaborates on the heightened downside risks to its forecasts in a sperate section.

---

6 ABC News, IMF forecasts big coronavirus growth hit amid world in a 'great lockdown', 14 April 2020. Available at: https://www.abc.net.au/news/2020-04-14/imf-forecasts-big-coronavirus-growth-hit/12147818 (accessed 20 April 2020).

7 IMF, April 2020, WEO, p.v

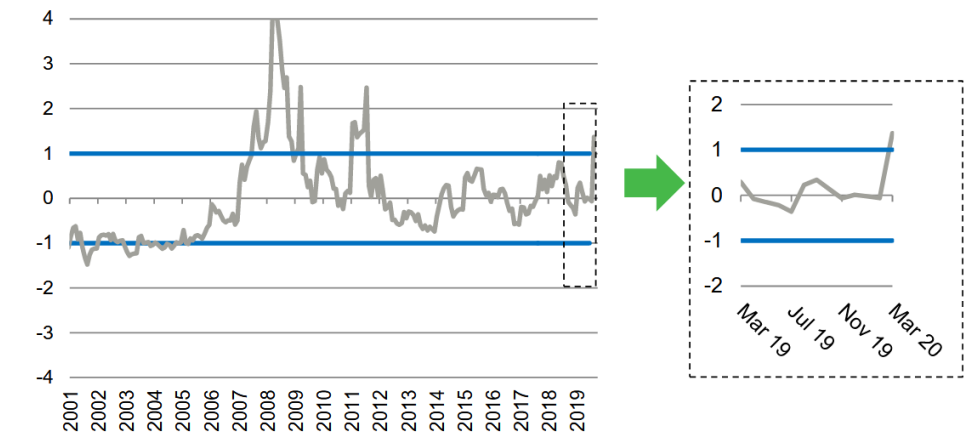
Severe Risks of a Worse Outcome

Even after the severe downgrade to global growth, risks to the outlook are on the downside. *The pandemic could prove more persistent than assumed in the baseline. Moreover, the effects of the health crisis on economic activity and financial markets could turn out to be stronger and longer lasting, testing the limits of central banks to backstop the financial system and further raising the fiscal burden of the shock. Of course, if a therapy or a vaccine is found earlier than expected, social distancing measures can be removed and the rebound may occur faster than anticipated.*

30. IPART itself publishes an uncertainty index and in March 2020 the index exceeded the 'one standard deviation' threshold that IPART established as a trigger for it to review its benchmark WACC estimates.

Figure 3-2: IPART uncertainty index

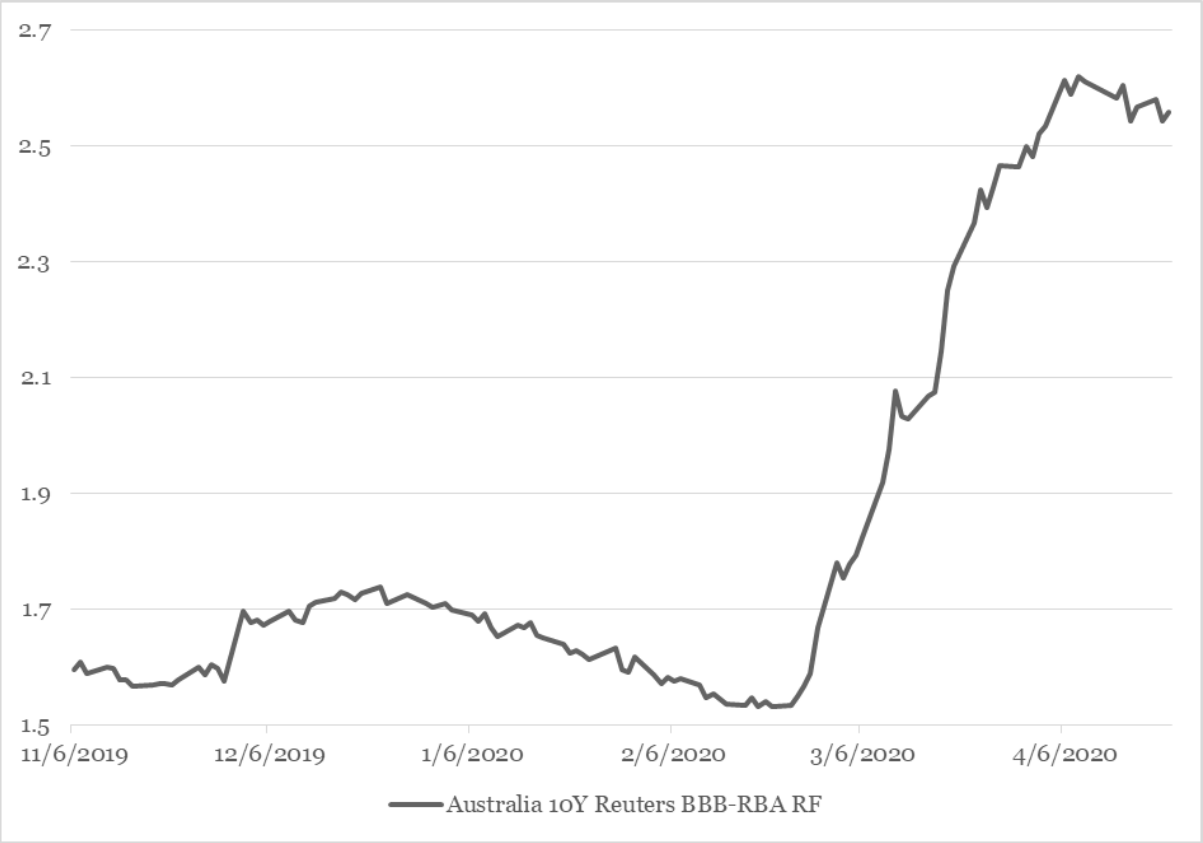
Figure 1 IPART's uncertainty index for end of March 2020



Source: IPART

31. Consistent with this, the risk premium on 10 year AUD BBB debt, as reported by Reuters, has increased by 60% in Australia since 31 January 2020.

Figure 3-3: Risk premium on AUD BBB 10 year debt as estimated by Reuters



Source: Reuters, CEG analysis

32. Bloomberg reports similar increases of 74% to 94% in the USA Canada and the UK.

33. The RBA has intervened in financial markets in unprecedented ways and, with the official cash rate reduced to just 0.5%, has committed to unorthodox monetary policy - undertaking the purchase of government bonds targeting interest rates at the 3 year tenor (rather than the overnight rate which has, until now, been the RBA policy target). Governor Philip Low made this statement on 19 March.

> *Financial market volatility has been very high. Equity prices have experienced large declines. Government bond yields have declined to historic lows. However, the functioning of major government bond markets has been impaired, which has disrupted other markets given their important role as a financial benchmark. Funding markets are open to only the highest quality borrowers.*
>
> ...

> *At a meeting yesterday, the Reserve Bank Board agreed to the following comprehensive package to support the Australian economy through this challenging period:*
>
> *…*
>
> *A target for the yield on 3-year Australian Government bonds of around 0.25 per cent.*
>
> *This will be achieved through purchases of Government bonds in the secondary market. Purchases of Government bonds and semi-government securities across the yield curve will be conducted to help achieve this target as well as to address market dislocations.*

34. As noted in the above quote, the Australian stock market has lost around one third of its value and major corporations, such as Virgin Australia, are entering into administration.

35. The uncertainty in financial markets has been reflected in the US Federal Reserve's decision not to release its March *Summary of Economic Projections*. See below transcript of press conference. [8]

> *March 15, 2020 Chair Powell's Press Conference Call FINAL Page 14 of 21*
>
> *Hi, Chair Powell. This is Jeanna Smialek from the New York Times. Thanks for taking our questions. I'm just curious—you know, obviously, you held this meeting in lieu of your meeting later this week. Will you still release a Summary of Economic Projections? And if not, how should we understand how you guys are thinking about the economy as the coronavirus shapes up?*
>
> *CHAIR POWELL. So why no—I guess you're asking, why no SEP, and what's our forecast? So a couple reasons we didn't do an SEP. First, we decided on Thursday to move the meeting up by three days to today, and that's before the SEPs are generally filed. They hadn't been filled out, and we—frankly, we spent our time focused on getting ready to make these announcements. Second, and, you know, a number of FOMC participants had already reached out to make the point that the economic outlook is evolving on a daily basis, and it really is depending heavily on the spread of the virus and the measures taken to affect it and how long that goes on. And that i s just not something that's knowable.* ***So, actually, writing down a forecast in that circumstance didn't seem to be useful, and, in fact, it could have been more of an obstacle to clear***

[8] US Federal Reserve, Transcript of Chair Powell's Press Conference Call, 15 March 2020, p. 14. Available at: https://www.federalreserve.gov/mediacenter/files/FOMCpresconf20200315.pdf (Accessed 20 April 2020).

> ***communication than a help***. *I do expect that we'll return to the quarterly—regular quarterly cycle in June, however.*

36. The RBA Governor, Philip Lowe, has similarly signalled that the May 2020 Statement of Monetary Policy may not include a single forecast but, rather, a focus on 'scenarios'.[9]

> *"Inevitably, the timing and pace of this recovery depend upon how long we need to restrict our economic activities, which in turn depends on how effectively we contain the virus. So it is difficult to be precise and it makes sense to think in terms of scenarios. Consistent with this, the Bank will discuss some* ***possible scenarios*** *in the Statement on Monetary Policy in a few weeks' time.*
>
> ***One plausible scenario*** *is that the various restrictions begin to be progressively lessened as we get closer to the middle of the year, and are mostly removed by late in the year, except perhaps the restrictions on international travel. … With many firms delaying or cancelling wage increases, year-ended wage growth is expected to decline to below 2 per cent, before gradually picking up again. In underlying terms, inflation is expected to remain below 2 per cent over the next couple of years.*
>
> *Of course, there are* ***other scenarios*** *as well. On the* ***optimistic side****, the restrictions could be lifted more quickly, with the virus being contained. In that case, a stronger recovery could be expected, particularly in light of the very large monetary and fiscal support that is in place. On th****e other hand****, if the restrictions stay in place longer, or they have to be reimposed, the recovery will be delayed and interrupted. In that case, the loss of incomes and jobs would be even more pronounced.*

37. Even if the RBA does provide a set of forecast associated the middle 'plausible scenario' (between the more and less optimistic scenarios) this:

- Does not mean that the middle forecast represents the RBA's mean (actuarially expected) forecast; nor
- Will still be an extremely uncertain forecast.

38. This is important in the context of IPARTs use of any inflation forecasts released in the May Statement of Monetary Policy – as we discuss in the next section.

---

9 Philip Lowe, An Economic and Financial Update, 21 April 2020. Available at: https://rba.gov.au/speeches/2020/sp-gov-2020-04-21.html (accessed 22 April 2020).

3.2 Uncertainty as it specifically pertains to inflation forecasts

39. The uncertainty around economic activity are amplified when it comes to forecasts of inflation. Consistent with the IMF's commentary on severe economic uncertainty and strong downside risks to forecasts, many respectable economic forecasters are warning of the potential for deflation.

40. Peter Downes, a former Treasury and OECD economic forecaster, modelled deflation towards the end of 2020-21. Mr Downes has been quoted in the Australian Financial Review, as follows:[10]

> *"Once you throw in the low oil prices with unemployment rising you get a disinflation dynamic developing," said Mr Downes, a former top forecaster at Treasury and the Organisation for Economic Co-operation and Development.*
>
> *"I'm getting inflation dropping below zero towards the end of 2020-21."*

41. The potential for deflation is heightened in current economic circumstances by virtue of the zero lower bound constraint on orthodox monetary policy. The above Australian Financial Review article discusses this.

> *To support the economy in response to the 2008-09 global financial crisis, the RBA slashed the official overnight cash rate by 4.25 percentage points to 3 per cent.*
>
> *But with no capacity to further cut the cash rate and the RBA deploying unconventional bond buying and cheap bank funding to drive down longer-term borrowing costs, the central bank will not be able to repeat its GFC emergency moves.*
>
> *"If inflation falls from 2 per cent to zero, that means real interest rates have risen by 2 percentage points," Mr Downes said.*
>
> ***"A normal monetary policy response to a crisis like this would be an aggressive 400 basis point reduction in the RBA cash rate.***
>
> ***"But we could have the opposite with an increase in real interest rates which would truncate the recovery."***

42. As already noted in the previous section, the RBA has responded by targeting both a 0.25% official cash rate but also a 0.25% yield on 3 year Commonwealth Government

[10] AFR, *Deflation spiral risks Depression repeat*, John Kehoe, Mar 26, 2020. Available at: https://www.afr.com/policy/economy/deflation-spiral-risks-depression-repeat-20200325-p54dvw (Accessed 20 April 2020).

Securities (effectively by offering to buy 3 year Commonwealth Securities whenever their yield is above 0.25%). This unorthodox monetary policy may help to stimulate the economy. However, the 3 year CGS yield was already at 0.51% at 28 February 2020. Thus, the extent of this stimulus is itself highly constrained by the already low interest rates along the entirety of the yield curve – which offer no possibility of the 400bp monetary stimulus Mr Downes estimated would be required.

43. The heightened prospect of deflation is a global phenomenon. On 20 April Bloomberg reported on global risks of deflation:[11]

> *Even before the coronavirus, inflation was very weak among industrial countries despite years of aggressive monetary easing following the global financial crisis, raising fears of spreading "Japanification." Plunging oil prices and tanking economic activity add to the concerns. While suspended factory production lines and shuttered shops will eventually reopen, job losses around the globe mean weakness in demand will persist."*

44. Some countries are already reporting deflation. The US reported negative inflation over the month of March with prices falling 0.4% on a seasonally adjusted basis.[12] This was largely driven by lower energy prices but even the index for all items less food and energy fell 0.1 %.[13] Capital Economics and Morgan Stanley are predicting deflation in the Eurozone.[14] Similar falls have been experienced in Singapore.[15] No doubt as more countries report inflation results over the next few months this list will grow longer.

45. The RBA governor, Philip Lowe, has, in the same speech quoted from above, predicted deflation for the year ended June 2020 – which would be the first time this has occurred since the early 1960s.[16]

> *In terms of inflation, we are also expecting a significant decline in the June quarter. The large fall in oil prices, combined with the introduction of free childcare and the deferral or reduction in some price increases mean that* ***it is quite likely that year-ended headline inflation will turn***

---

11 Bloomberg, *Why Deflation Is Poison for Virus-Plagued Economies,* April 2020, Available here

12 https://www.bls.gov/news.release/cpi.nr0.htm

13 https://www.bls.gov/news.release/cpi.nr0.htm

14 https://www.telegraph.co.uk/business/2020/04/05/spectre-japanification-haunts-eurozone-amid-virus-carnage/

15 https://www.thestar.com.my/business/business-news/2020/03/23/singapore039s-key-price-gauge-flashes-deflation-for-first-time-in-decade-on-virus-woes

16 Philip Lowe, An Economic and Financial Update, 21 April 2020. Available at: https://rba.gov.au/speeches/2020/sp-gov-2020-04-21.html (accessed 22 April 2020).

> ***negative in June***. *If so, this would be the first time since the early 1960s that the price level has fallen over a full year. In underlying terms, however, inflation is expected to remain positive*. [Emphasis added.]

46. However, alongside the fears of prolonged deflation some economists are also worried about inflation increasing once Covid-19 threat reduces (e.g., post vaccine). The theoretical channel via which this may occur is if fiscal and monetary stimulus, in an attempt to reduce unemployment, pushes against supply chains that have been fractured by the epidemic. The IMF summarises the competing theoretical outcomes (deflation and inflation) as follows

> *…in some countries, supply chain disruptions and shortages can lead to prolonged price increases and trigger expectations of rising inflation; in others, persistently weak demand may lead to drastically lower inflation expectations and worries about entrenched debt-deflation spirals.*

47. The Centre for Economic Policy Research has published a paper recently looking for historical parallels for the current economic shock and the potential for these shocks to lead to longer term inflationary impacts. Their conclusions are agnostic:[17]

> *Might inflation rise as a result of policies undertaken during the current crisis and as demand comes back more strongly than supply when it ends? This column argues that it is possible, but far from clear. Indeed, there are reasons to doubt whether any rise in inflation will come. Looking back at past crises – and in particular wars – reveals some similarities but more differences with the current pandemic. There was more reason to see UK inflation rise after the three major wars of the past 220 years; and even then, the evidence that it did is not conclusive.*

48. Bloomberg also summarises the case for a potentially high inflation outcome as follows:[18]

> *Some think deflation concerns triggered by the pandemic are overplayed since prices could jump as economic activity resumes and the impact of government and central bank stimulus kicks in, spurring demand. Yet, even after the pandemic is over, the scars from the shutdown -- poor jobs prospects, shattered consumer confidence and patchy recovery in global supply chains -- may prevent a quick recovery and thus keep a lid on inflation. Inflation is typically an easier challenge for central banks in major economies to cope with, because they have plenty of room to raise interest rates from current rock-bottom levels.*

---

17 https://voxeu.org/article/will-inflation-make-comeback-after-crisis-ends

18 Bloomberg, *Why Deflation Is Poison for Virus-Plagued Economies,* April 2020, Available here.

49. In summary, it is theoretically possible that inflation will rebound once the COVID-19 threat abates and it is possible that this abatement will occur within the next four years. Thus, while the weight of economic threats is for low or negative inflation, there is a potential for higher inflation outcomes – even outcomes that are within the RBA range of 2-3% pa. (There would appear to be little prospect of consistent above target inflation, given that the RBA has unlimited potential to raise interest rates in response to an inflationary outbreak).

50. With such a wide range of possible outcomes – from deflation to within target inflation – the problem is to arrive at a sensible actuarially fair inflation forecast. An actuarially fair inflation forecast is one that gives each possible inflation outcome a probability that matches its true probability of occurring. This actuarially fair forecast is the probability weighted average of all possible outcomes.

51. For example, there might be:

- a 40% probability that 4 year inflation will be 2% (at the bottom of the RBA target range); but
- a 12% probability of 5 alternative scenarios occurring where inflation is: alternately, 1.5%, 1.0%, 0.5%, 0%, and -0.5%.

52. Faced with these perceived probabilities an investor's (actuarially) expected inflation will be 1.1%. This is not withstanding the fact that the most likely outcome (40% likely) may well be that inflation is around 2.0%.

53. In the context of a very wide dispersion of possible inflation outcomes, market based measures of expected inflation have an advantage over simple analyst forecasts of the most likely inflation outcomes (including Government analysts such as the RBA). This is because, in the presence of asymmetry, the most likely inflation outcome (which is typically what published forecasts predict) will not equal the mean actuarially expected inflation outcomes (which is what prices in financial markets reflect).

54. In this regard, it is critical to keep in mind that market based measures of expected inflation over the next four years are less than 0.5%pa (see Figure 3-1 above). While these measures may not be perfectly accurate, they have materially better predicted actual inflation than an assumption of 2.5% over the last ten years. At a minimum, the extreme difference between market estimates at the mid-point of the RAB target band suggests an extreme level of uncertainty about the accuracy of any inflation forecast.

55. The dramatic declines in market based estimates suggest that market participants are attaching a non-trivial probability to very low, or negative, inflation outcomes over the next four years. It is important to understand that this *does not* imply that markets believe that zero or negative inflation is the most likely outcome. Market

participants may well be willing to trade in inflation swaps at 0.4% while simultaneously believing that:

- the most likely inflation will average between 1.0% and 2.0% over this period; but
- A non-trivial probability exists that inflation will be much lower than this "most likely" outcome.

56. This must be kept in mind when interpreting any RBA projections of inflation. The RBA may forecast one inflation outcome but include a discussion of 'downside' and 'upside' risks to that forecast. It would be a mistake to interpret any projection(s) made by the RBA to be the RBA's actuarial expectation of inflation outcomes. Indeed, this is implicit in Governor Lowe's speech that, in the current environment, the focus should be on 'scenarios' rather than any single scenario. [19]

[19] Philip Lowe, An Economic and Financial Update, 21 April 2020. Available at: https://rba.gov.au/speeches/2020/sp-gov-2020-04-21.html (accessed 22 April 2020).

4 The impact of extreme uncertainty on financeability

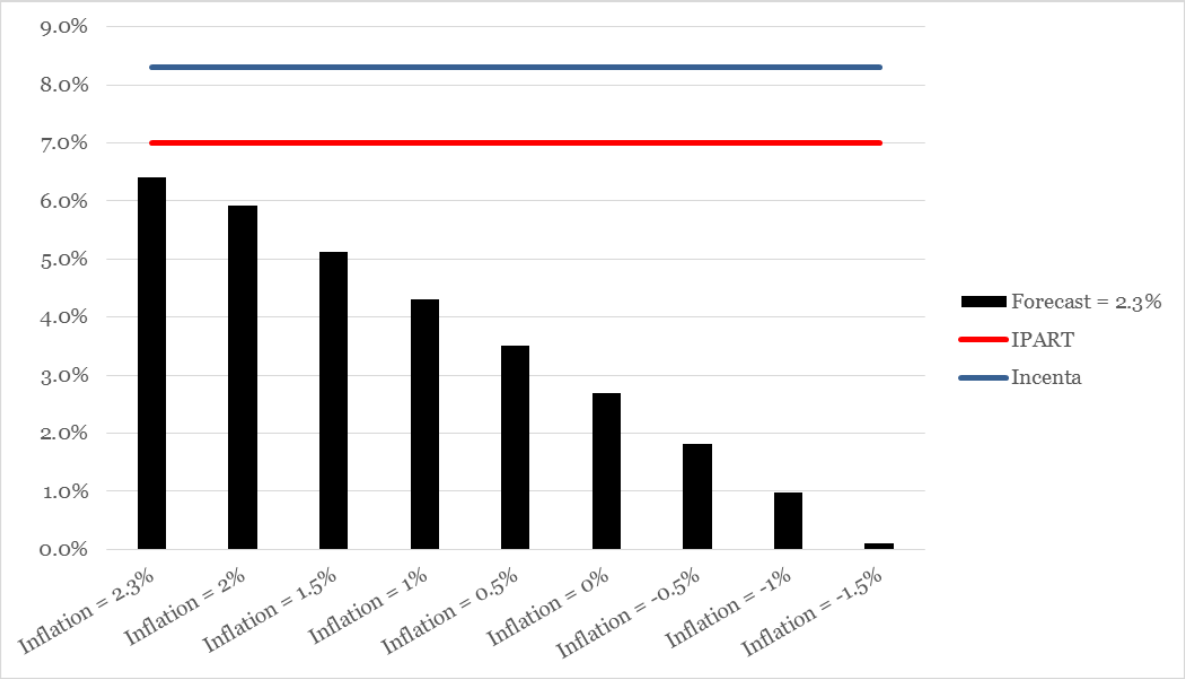
57. The heightened uncertainty about inflation outcomes has important implications for the financeability of WaterNSW. In IPART's draft report, WaterNSW was projected to achieve lower than the IPART BBB threshold for real free funds from operations (FFO) over debt (albeit with above threshold real interest. cover ratio (ICR)).

58. However, these forecasts of financeability metrics are predicated on IPART's inflation forecast of 2.3% actually occurring. Specifically, the metrics forecast by IPART are real (inflation adjusted) metrics that explicitly rely on WaterNSW being able to raise new debt each year (a source of funds) backed by a RAB that is assumed to be rising at 2.3% pa.

59. If inflation is lower than 2.3% then this source of funds is not available to WaterNSW (at least not at the target gearing level) and, consequently, the real FFO to debt and ICR will be lower.

60. Given the evidence surveyed above, it must be acknowledged that there is a material probability that actual inflation will be lower than this. Figure 4-1 below shows the average FFO to debt over the four-year regulatory period under different assumptions about what actual inflation turns out to be. In each case it is assumed that IPART's forecast of inflation is 2.3%. The lower actual inflation is, the lower the outturn real FFO to RAB will be – this is because growth in the RAB is lower and, therefore, there is less funding available from new debt backed by the growing RAB.

Figure 4-1: Real FFO to Debt for different actual inflation outcomes



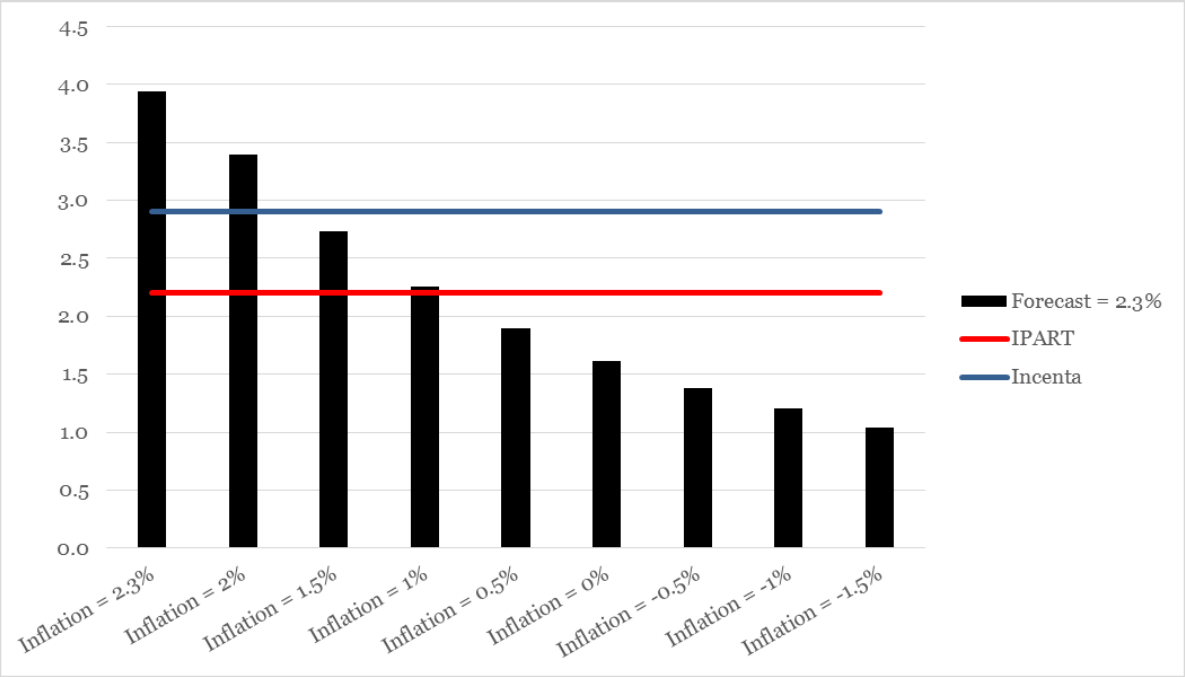
*Source: CEG analysis, IPART draft report financial model for WaterNSW; *These scenarios assume a current debt margin of 2.55% (including 16 bp for debt raising costs and annualisation factor adjustment) as estimated in an accompanying CEG report for March 2020.*

61. It can be seen that if actual inflation is in line with market-based forecasts (between 0.0% and 0.5%) then real FFO to debt would be less than half of the IPART BBB threshold of 7.0% (and materially less than half of the threshold that would be adopted if IPART accepted Incenta's advice on the appropriate adjustment when moving from nominal to real metrics).

62. Similarly, under the assumption that inflation will actually be 2.3% pa, WaterNSW will achieve a higher real ICR than IPART's BBB threshold of 2.2% (and higher than the threshold consistent with Incenta's advice). However, if inflation is in line with market estimates of 0.0% to 0.5% then real ICR will be below both the IPART and the Incenta thresholds, as shown in Figure 4-2.[20]

[20] The formula for real ICR is $Real\ ICR_t = \frac{Real\ FFO_t + r_t}{r_t}$. As shown in the figure, real ICR declines logarithmically as real interest rates rise.

Figure 4-2: Real ICR for different actual inflation outcomes



*Source: CEG analysis, IPART draft report financial model for WaterNSW. *These scenarios assume a current debt margin of 2.55% (including 16 bp for debt raising costs and annualisation factor adjustment) as estimated in an accompanying CEG report for March 2020.*

63. Even if forecast inflation did turn out to be 2.3%, WaterNSW would face a financeability problem due to real FFO to debt being below the BBB threshold (for both IPART and Incenta methods).

64. However, it is important to acknowledge that the 2.3% estimate is unlikely to be accurate. We do not know with certainty which of the pictured actual inflation outcomes will occur. The extreme uncertainty that exists for forecast inflation means that inflation could plausibly fall anywhere in the depicted range (albeit with reduced probability at either ends of the depicted inflation outcomes).

65. This extreme uncertainty implies a heightened probability of forecast error and, therefore, a heightened probability that WaterNSW finds itself is in the middle range of the depicted inflation outcomes where it:

    - Falls badly short of IPART's (let alone the Incenta) real FFO to debt BBB threshold; and
    - Falls short, or only just exceeds, IPART's (let alone the Incenta) real ICR BBB threshold.

66. We consider that it would be prudent for IPART to pre-empt the problem by making changes to its approach towards inflation. We discuss this in the next section.

5 Solutions to financeability problems

67. The financeability concern identified in the previous section is severe when forecast inflation exceeds actual inflation. (The problem remains, but is less extreme, in scenarios when actual outturn inflation is 2.3% - as evidenced by the bars on the left hand side of Figure 4-1 and Figure 4-2 above).

68. There are two potential, mutually compatible, mechanisms by which IPART could mitigate the risk to measured financeability metrics over the 2020-24 regulatory period.

    a. Ensure that the opening RAB for the 2024-28 regulatory grows at the level forecast for the 2020-24 period (even if actual inflation is different to forecast);

    b. Raise revenues in the 2020-24 period by, for example,:

        i. Adopting a lower effective inflation forecast than 2.3% during the 2020-24 period; and/or

        ii. Accelerating depreciation over the 2020-24 regulatory period.

69. The first solution (a.) goes directly to the cause of the financing problem in the face of extreme uncertainty about forecast inflation. It effectively removes inflation forecasting error as a source of risk for the next regulatory period. In our view, this is the foundation measure that IPART should adopt in the context of the current extreme levels of forecast uncertainty. The measures (b.i.) and (b.ii.) are, in our view, potentially important adjuncts to measure (a.).

5.1 Ensure the RAB grows in line with IPART forecast inflation (an inflation "true up")

70. The reason extreme uncertainty in inflation forecasts gives rise to financeability concerns is that IPART's financeability metrics, as estimated in the revenue model, are only meaningful if the 2024 opening RAB will grow at 2020-24 forecast inflation. If there is inflation forecast error, as is all but assured when there is extreme uncertainty around the forecast, this assumption does not hold and serious financeability concerns are raised.

71. In the face of extreme uncertainty around its inflation forecast, it is open to IPART to commit to ensuring that WaterNSW's 2024 opening RAB will actually rise at the rate that IPART forecasts will happen in its revenue determination. If IPART does so, then WaterNSW can actually fund its operations by raising debt against that RAB growth (in precisely the same way that IPART's financeability metrics assume it will).

72. By doing so, IPART would essentially be removing inflation forecast risk from all stakeholders (including customers).

73. This approach can be implemented in a number of different ways. For example, the following two methods are NPV equivalent:

    a. Use IPART's forecast of inflation instead of using actual inflation when rolling the RAB forward. From an administrative perspective, this is a very simple way to implement the solution. All that is required is entering the 2020-24 inflation forecast value into the 2020-24 RAB roll forward model; or

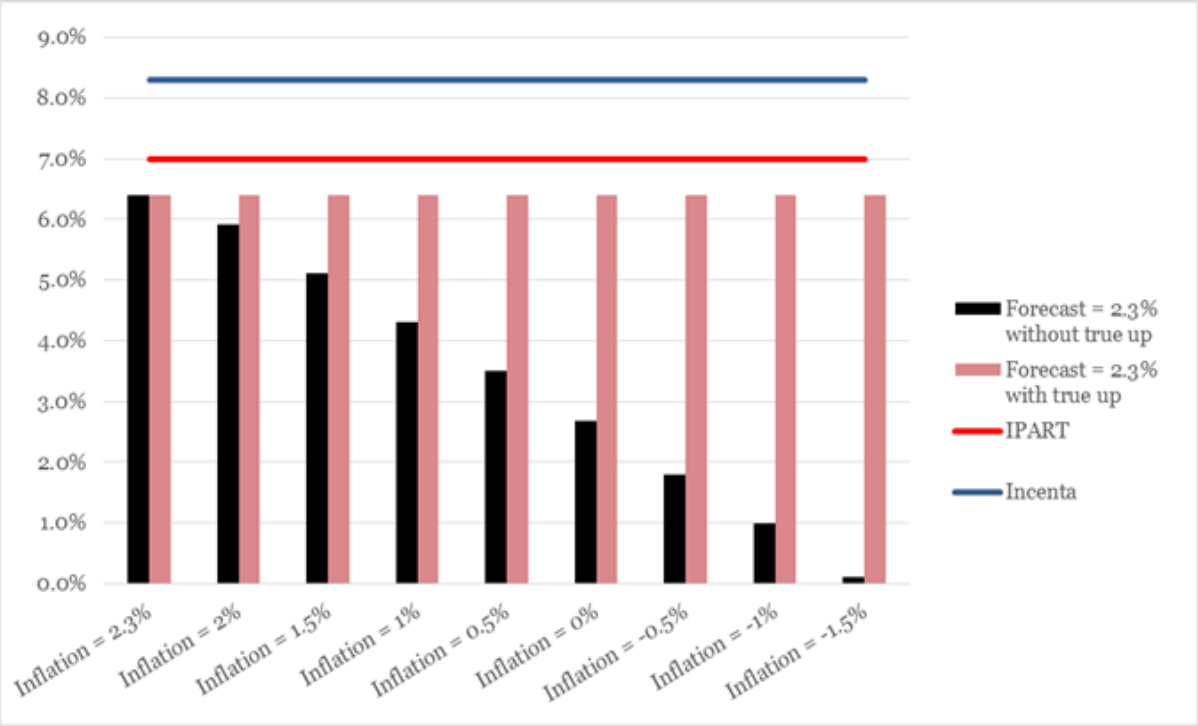
    b. Continue to use actual inflation when rolling forward the RAB to the 2024 opening value. However, commit to including a new asset class that captures the present value of any inflation forecast error over 2020-24.

74. Both of these approaches amount to a 'true up' for inflation forecast error in the 2024 opening RAB. They will result in an identical overall value of the opening RAB in 2024. However, approach (a.) has the advantage of being extremely simple to administer - in that the existing roll-forward structure and asset classes in the building block model are unchanged. Approach (b.) has the advantage that, by creating a separate new asset, it is then simple to apply a specific period (e.g., one or two regulatory periods) over which the inflation forecast error is depreciated.

75. If this approach is adopted then the inflation forecast adopted by IPART is, by design, always an accurate forecast of the rate at which the RAB will grow. Therefore, it is possible to estimate the financeability metrics that result from this and compare them to the financeability metrics that result from a 2.3% inflation forecast with no inflation true up.

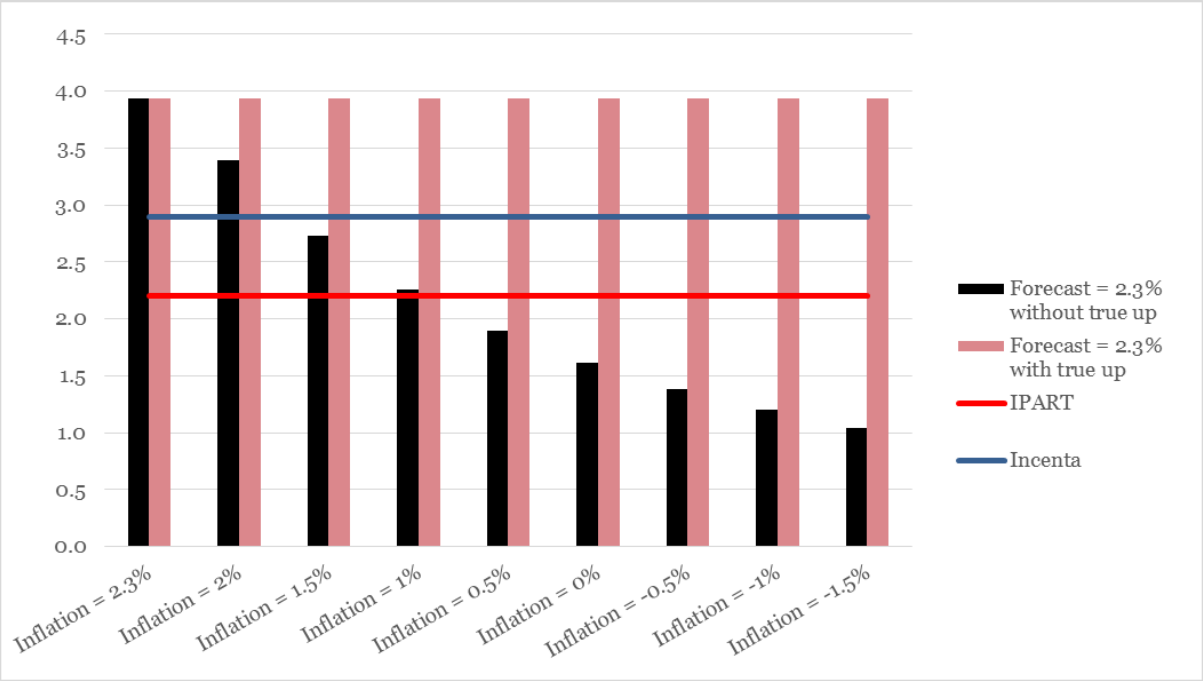
76. This is illustrated in Figure 5-1 and Figure 5-2 where the black bars reflect financeability metrics without an inflation true up while the pink bars reflect financeability with an inflation true up. It can be seen that, without a true up, financeabiltiy deteriorates with inflation forecast errors. By contrast, financeability remains constant irrespective of forecast errors if IPART commits to an inflation true up.

Figure 5-1: Real FFO to debt with a 2.3% inflation forecast but with and without an inflation true up



*Source: CEG analysis, IPART draft report financial model for WaterNSW. *These scenarios assume a current debt margin of 2.55% (including 16 bp for debt raising costs and annualisation factor adjustment) as estimated in an accompanying CEG report for March 2020.*

Figure 5-2: Real ICR with a 2.3% inflation forecast but with and without an inflation true up



*Source: CEG analysis, IPART draft report financial model for WaterNSW. *These scenarios assume a current debt margin of 2.55% (including 16 bp for debt raising costs and annualisation factor adjustment) as estimated in an accompanying CEG report for March 2020.*

5.2 NPV neutral revenue increases in the 2020-24 period

77. It can be seen from Figure 5-1 that, even with an inflation true up, real FFO to debt is still (well) below the (Incenta) IPART BBB threshold when 2.3% inflation is forecast. It is therefore appropriate to consider NPV neutral mechanisms for bringing revenues forward from future periods into the 2020-24 period.

78. Implementing such a mechanism can also be expected to have positive price smoothing and intergenerational fairness benefits. This is because the risks to a 2.3% inflation forecast are, clearly, dominated by downside risks. Consequently, it is likely that a 2.3% inflation forecast will underestimate true costs in the 2020-24 period and that this will, under an inflation true up, result in higher cost recovery in subsequent regulatory periods.

5.2.1 Adopt a lower effective inflation forecast

79. A lower "effective inflation forecast" can be implemented by explicitly setting a lower inflation value in IPART's revenue model (e.g., lowering the forecast to 1.7%). This is the most administratively simple method. However, a lower effective inflation

forecast can also be achieved by including a new building block in the model that captures the cost difference between an inflation forecast of 2.3% and 1.7%.[21]

80. An effective inflation forecast of 1.7% would represent a 2/3rd weight to 2.3% and a 1/3rd weight to the top of the range for market-based estimates of four-year inflation (0.5%). It would also be consistent with the RBA's February Statement of Monetary Policy one year forecast for the year ended June 2021.

81. If IPART adopts a lower effective inflation forecast than 2.3%, then this will improve the financeability metrics over 2020-24. This is true with or without a commitment to use forecast inflation in the RAB roll forward model. However, the combined effect of both:

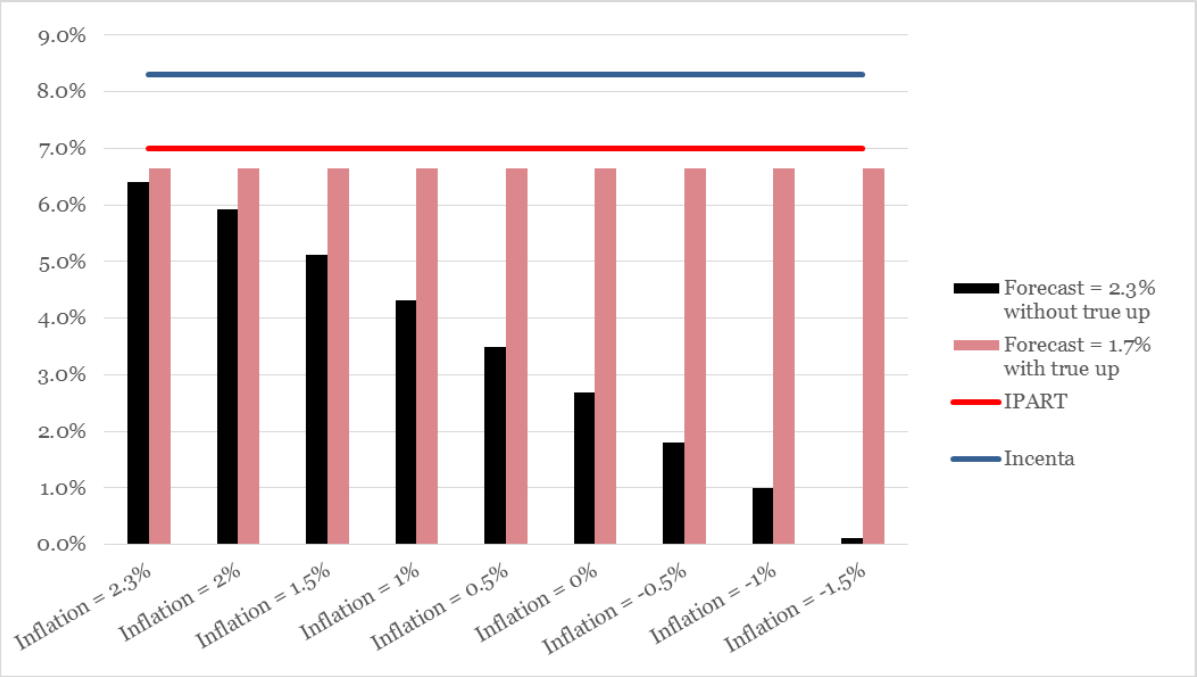
    - committing to use forecast inflation in the RAB roll forward model (or, equivalently, performing an inflation true up calculation); and
    - adopting a forecast of inflation that is lower than 2.3%;

    improves financeability more than either approach implemented alone.

82. If IPART commits to a "true up" of inflation forecast errors, then adopting a lower effective forecast of inflation has zero NPV effect on compensation. This is because any higher revenue in the 2020-24 regulatory period is offset by a lower value of inflation "true up" included in the opening RAB in 2024. This is why the credit metrics are constant irrespective of actual inflation when a 1.7% inflation forecasts is combined with an inflation true up in Figure 5-3 and Figure 5-4.

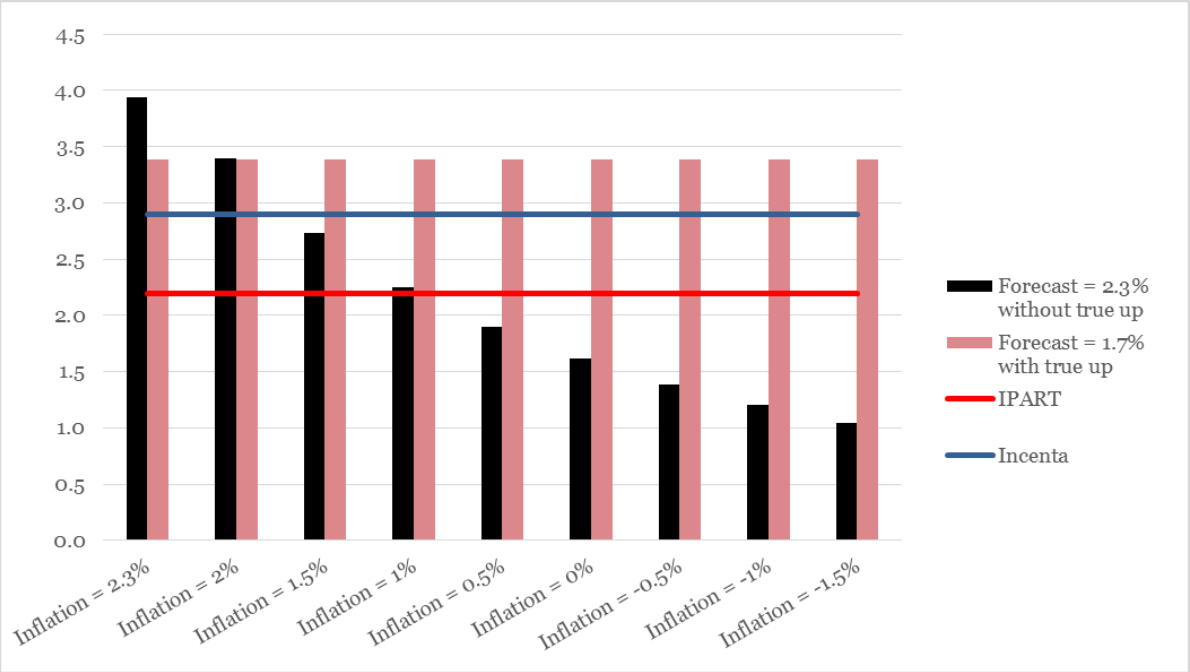
[21] If a building block placeholder for the likely inflation forecast error is used the value of that building block will determine the effective inflation forecast. (The higher the building block $ value the lower the effective inflation forecast.) When it comes to performing the true up calculation, this can be done by simply using the effective inflation forecast implied by the value of the building block,

Figure 5-3: Real FFO to debt with: a) 2.3% inflation forecast and no true up; b) 1.7% inflation forecast and a true up



*Source: CEG analysis, IPART draft report financial model for WaterNSW. *These scenarios assume a current debt margin of 2.55% (including 16 bp for debt raising costs and annualisation factor adjustment) as estimated in an accompanying CEG report for March 2020.*

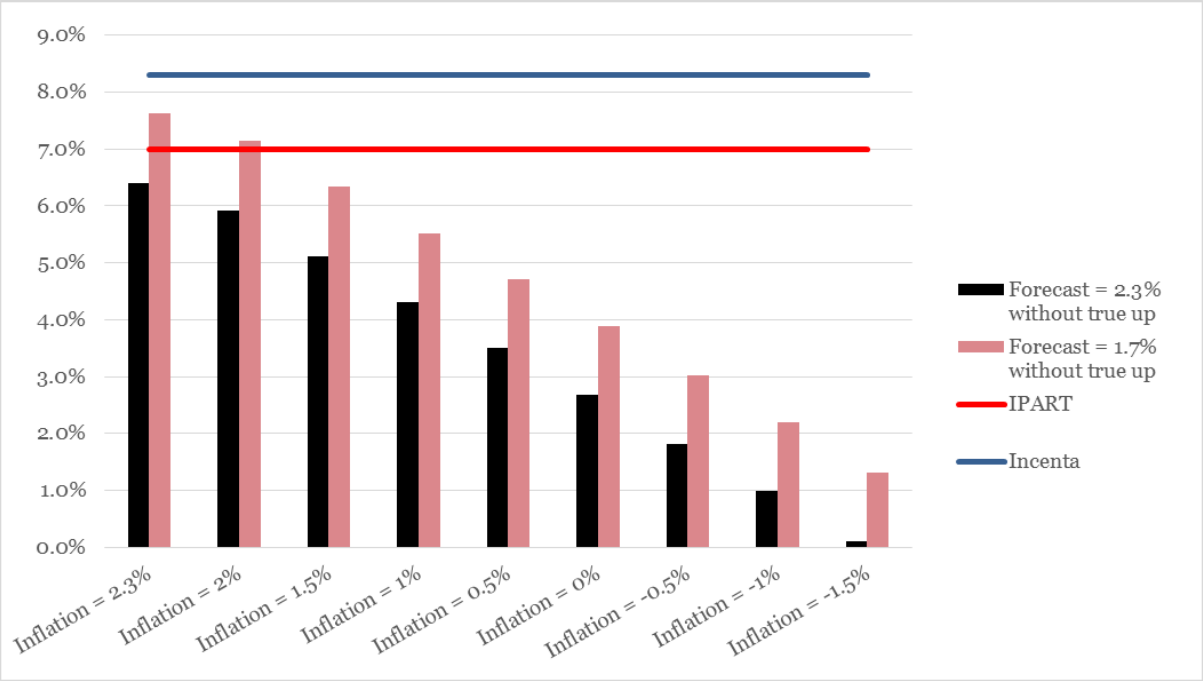
Figure 5-4: Real ICR with: a) 2.3% inflation forecast and no true up; b) 1.7% inflation forecast and a true up



*Source: CEG analysis, IPART draft report financial model for WaterNSW. *These scenarios assume a current debt margin of 2.55% (including 16 bp for debt raising costs and annualisation factor adjustment) as estimated in an accompanying CEG report for March 2020.*

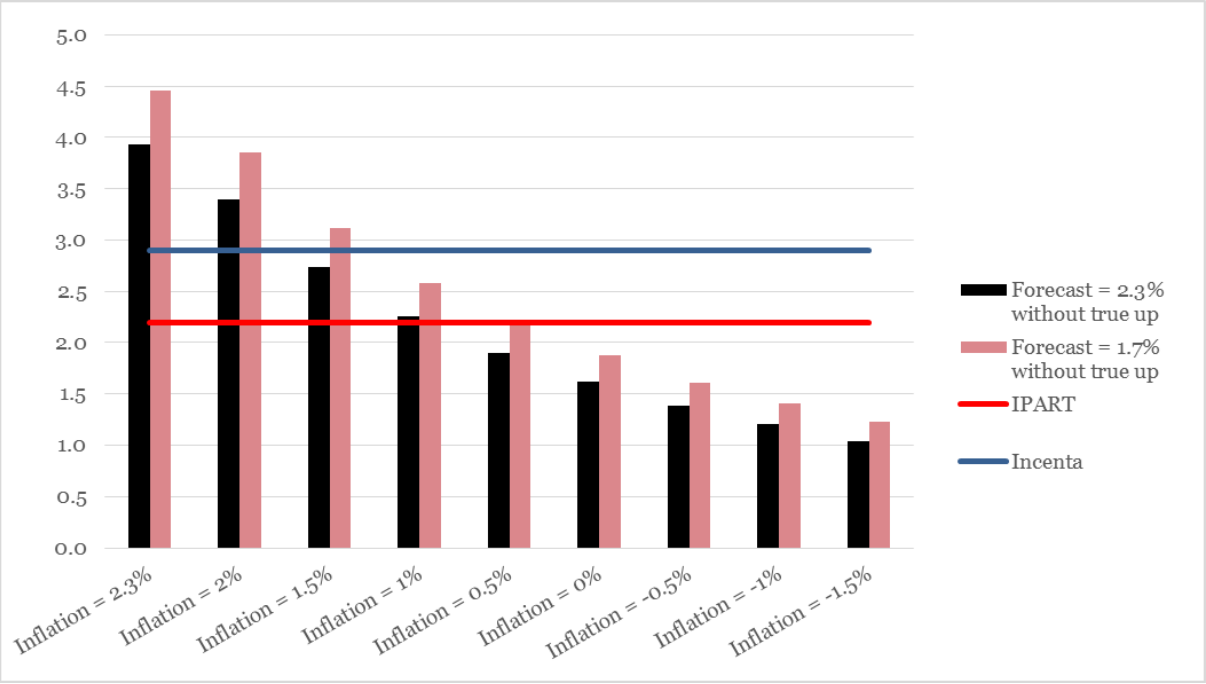
83. If IPART does not commit to an inflation forecast error "true up" then windfall gains and losses are borne by stakeholders. The following two charts show how real FFO to Debt and real ICR would be impacted if IPART adopted a 1.7% inflation forecast instead of a 2.3% forecast (but did **not** commit to an inflation true up when rolling forward the RAB to 2024). It can be seen in Figure 5-5 and Figure 5-6 that, although the metrics are raised relative to the scenario with a 2.3% inflation forecast, they are still materially below the IPART threshold at low inflation outcomes (especially for real FFO to debt).

Figure 5-5: Real FFO to Debt when 2.3% vs 1.7% inflation forecast used (no commitment to an inflation true up)



*Source: CEG analysis using IPART Regulator financial and pricing model for WaterNSW (Greater Sydney). Additional assumptions are based on IPART, "Consultation on Debt Margin" April 2020; *These scenarios assume a debt margin of 2.55% (including 16 bp for debt raising costs and annualisation factor adjustment) as estimated in an accompanying CEG report for March 2020.*

Figure 5-6: Real ICR when 2.3% vs 1.7% inflation forecast used (no commitment to an inflation true up)



*Source: CEG analysis using IPART Regulator financial and pricing model for WaterNSW (Greater Sydney). Additional assumptions are based on IPART, "Consultation on Debt Margin" April 2020; *These scenarios assume a debt margin of 2.55% (including 16 bp for debt raising costs and annualisation factor adjustment) as estimated in an accompanying CEG report for March 2020.*

84. The extreme uncertainty around actual inflation outcomes creates the following tension in the absence of an inflation true up:

    - A small reduction in inflation forecasts (e.g., to 2.0%) will not resolve financeability concerns because the risk of a severe financeability problem will remain, should actual inflation be materially lower than that forecast; and
    - A large reduction in inflation forecasts (e.g., to 1.0%) will largely resolve financeability concerns but will come at the risk of a windfall gain accruing to WaterNSW if inflation is higher than that forecast.

85. By contrast, if IPART committed to a true up of inflation forecast error then the financeability metrics would be unaffected by actual inflation (because actual inflation would not determine RAB growth.

86. We therefore consider that IPART should combine a reduction in inflation forecasts below 2.3% with a commitment to perform an inflation true up in the 2024 opening RAB.

5.2.2 An annual true up

87. It is worth noting that an annual true up for inflation forecast error within 2024 is a single measure that combines both:

    a. an NPV neutral inflation true up; and

    b. raising revenues in 2024 to account for the high risk of below forecast inflation.

88. Specifically, if there was a difference between actual and forecast inflation during a given year of the 2020-24 regulatory period, prices in subsequent years of the 2020-24 regulatory period[22] would be adjusted upwards/downwards as appropriate to eliminate the NPV impact of the forecast error.[23]

89. An annual true up is, due to annual price adjustments, administratively more complex than simply using forecast inflation to roll forward the RAB. However, if IPART maintains an effective inflation forecast of 2.3%, our view is that the administrative complexity of an annual true up approach would be justified

90. This is because the high probability for exceptionally large forecast error using a 2.3% inflation forecast means that waiting until the next regulatory period to correct for forecast errors is problematic on both: equity grounds (e.g., should future customers bear a large burden for current customers benefiting from a windfall?); and on risk grounds (e.g., will market conditions in 2024-28 permit a large recovery of the losses from 2020-24?).

5.2.3 Adopt accelerated depreciation over 2020-24

91. The other way in which 2020-24 revenues can be raised is if IPART accelerates depreciation over the 2020-24 regulatory period. This will bring forward equity cash-flows from future regulatory periods and, in doing so, it will boost free funds from operations over 2020-24. This will improve both real FFO to debt and real ICR over the 2020-24 regulatory period.

92. However, this effect is somewhat illusory because it means that both: FFO in future regulatory periods will be lower; and the ability to borrow against a growing RAB will be diminished (the RAB will grow more slowly with accelerated depreciation).

93. For this reason, we consider that it would be inappropriate to pursue this solution as an alternative to an inflation true up. Accelerated depreciation is not, on its own, an

[22] Forecasts errors in the final year of 2020-24 would need to be adjusted for in the 2024-28 regulatory period.

[23] Under this approach, even if a 2.3% inflation forecast was maintained, if inflation was 1.0% pa then the 'true up' would be applied to revenues within the regulatory period. This immediate increase in revenues would address the financeabilty problem directly and, consequently there would be no need to escalate the RAB to 2024 using forecast inflation (2.3%) instead of actual inflation (1.0%).

effective way to deal with the extreme uncertainty associated with actual inflation outcomes. However, it is a potentially useful tool to raise FFO in 2020-24 in a present value neutral way while dealing with inflation forecast risk via an inflation true up mechanism.

94. For example, we estimate that if IPART adopts a 2.3% inflation forecast and commits to an inflation forecast true up then FFO to debt will still be 6.4% - below IPART's threshold of 7.0%. IPART could accelerate depreciation by 18% and this would raise real FFO to debt up to the lower BBB threshold of 7.0%.

6 Uncertainty and the cost of capital

95. The current levels of market wide uncertainty can be expected to raise the required return for equity investors across the economy, including for investors in WaterNSW.

96. We consider that the most effective way that IPART can deal with this uncertainty is to implement the solutions set out in sections 5.1 and 5.2.

97. If these solutions are put into effect, it would be reasonable for IPART not to implement any, or at most a modest, increase in the WaterNSW's WACC. This conclusion is based on recognition that IPART's WACC regime already responds appropriately to heightened uncertainty by virtue of raising the current market risk premium estimate well above the long term estimate (9.7% vs 6.0%). When this is combined with our estimate of the elevated current debt risk premium (2.55%) and also the inflation true up the case for a further WACC uplift is to respond to the heightened uncertainty is reduced.

98. However, if IPART chooses not to implement the policies set out in sections 5.1 (inflation "true up") and 5.2 (NPV neutral revenue increases in 2020-24) then the uplift to the WACC for heightened uncertainty should be much greater. Indeed, should IPART not commit to an inflation 'true up' then, arguably, equity in WaterNSW will be regarded as higher risk than the market as a whole over the next four years.

99. To see why, consider the correlation of WaterNSW equity return with the market return under two scenarios:

    a. IPART forecasts 2.3% inflation and this turns out to be more or less accurate. This scenario is consistent with a positive outcome for the overall economy;

    b. IPART forecasts 2.3% inflation but actual inflation turns out to be 0.5% (in line with the top of the range for inflation swaps). This outcome is consistent with a negative outcome for the overall economy.

100. In scenario a., WaterNSW will, other things equal, achieve its target post tax return on equity of 7.5%. This will be comprised of 5.2% in cash over 2020-24 and 2.3% in RAB escalation embedded in the opening RAB for 2024-28. That is, a 5.2% real return and a 7.5% nominal return.

101. However, in scenario b., WaterNSW will, other things equal, earn a return of only 3.0% nominal (2.5% real) over the four years.[24]

[24] This 3.0% is calculated as follows:

- 5.20% cash return to equity holders over the regulatory period (the same as in scenario a.); **plus**

102. Thus, holding all other things constant, in circumstances where the economy performs poorly (consistent with very low inflation), equity investors in WaterNSW will earn less than half the target return IPART originally set over the 4 year regulatory period.[25] However, in circumstances where the economy performs well (consistent with actual inflation matching forecast inflation) equity investors in WaterNSW will perform in line with expectations.

103. This simple example illustrates how, absent an inflation 'true up' mechanism, the prevailing extreme levels of inflation forecast risk materially increase beta risk for WaterNSW equity investors. Should IPART decide not to implement a 'true up' mechanism for inflation forecast error then we consider that an uplift to the equity beta of at least 0.2 should be applied.

104. A 0.2 uplift to the equity beta raises the post tax WACC by around 0.6%. This same uplift can be achieved by giving zero weight to the current WACC estimates and 100% weight to the long-term WACC estimates.

105. Table 6-1 shows our updated WACC estimates for WaterNSW based on our short term debt premium estimate of 2.55% (rounded down to 2.5% compared to IPART's rounded estimate of 2.1%) and our inflation estimate of 1.7% (compared to IPART's estimate of 2.3%).[26] All other parameter estimates in the table are IPART's estimates as at March 2020.[27] This table assumes that IPART addresses the financeability

- 0.50% inflation indexation of the equity funded portion of the regulatory asset value; **less**
- 2.70% as a result of under-compensation for the nominal cost of debt on the 60% of the assets that are be funded by debt (2.70%=(60%/40%)×(2.30% - 0.50%)).
    - This under-compensation results from the fact that debt holders must be paid their nominal return irrespective of inflation outcomes. However, IPART only provides compensation to do so based on:
        - nominal debt costs; plus
        - less IPART forecast inflation (2.30%); plus
        - actual inflation (0.50%)
    - Consequently, equity investors bear IPART inflation forecast error on both the equity and debt funded portion of the assets. However, because the equity portion of the assets is only 40%, the debt funding shortfall due to inflation forecast error (1.8%) is magnified by 1.5 (60/40) times.

25 This is true whether expressed in real or nominal terms.

26 Our debt premium estimate of 2.55% was derived from our accompanying report, and includes 12.5 bp debt raising costs and 4 bp annualisation factor based on IPART's January 2020 estimate.

See: CEG, Estimating RBA 10-year BBB spread to AGS for 31 March 2020, Memorandum to WaterNSW, 24 April 2020.

27 IPART, Consultation on debt margin, April 2020, p. 5.

issues surrounding inflation forecasts and, as such, does not include the 0.6% uplift to the WACC discussed above.

106. Our post-tax real WACC estimate is **4.0%**, which is 80 bp higher than IPART's 3.2% estimate.

Table 6-1: Updated IPART WACC estimate based on CEG estimates of inflation and short term debt margin

	Current market data	Long term averages	Lower	Midpoint	Upper
Nominal risk free rate	0.9%	3.1%			
Inflation	1.7%	1.7%			
Debt margin	2.5%	2.6%			
Market risk premium	9.7%	6.0%			
Debt funding	60.0%	60.0%			
Equity funding	40.0%	40.0%			
Total funding (debt+equity)	100%	100%			
Gamma	0.25	0.25			
Corporate tax rate	30.0%	30.0%			
Effective tax rate for equity	30.0%	30.0%			
Effective tax rate for debt	30.0%	30.0%			
Equity beta	0.7	70.0%			
Cost of equity (nominal post-tax)	7.7%	7.3%			
Cost of equity (real post-tax)	5.9%	5.5%			
Cost of debt (nominal)	3.4%	5.7%			
Cost of debt (real)	1.7%	3.9%			
Nominal Vanilla (Post-tax nominal) WACC	5.1%	6.3%	5.1%	5.7%	6.3%
Post-tax real WACC	**3.4%**	**4.6%**	**3.4%**	**4.0%**	**4.6%**
Pre-tax nominal WACC	6.0%	7.2%	6.0%	6.6%	7.2%
Pre-tax real WACC	4.2%	5.4%	4.2%	4.8%	5.4%

Source: IPART, RBA, CEG analysis